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VII.—NOTES ON SOME TREMATODE PARASITES OF FISHES.

(Plates VII., VIII.)

By THOMAS SCOTT, LL.D., F.L.S.

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VII.—NOTES ON SOME TREMATODE PARASITES OF FISHES.

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(Plates VII., VIII.)

One or two papers on parasitic Trematodes of fishes have already appeared in Part III. of the Annual Reports of the Fishery Board for Scotland, published in previous years. In the present paper four species, in addition to those previously published, are recorded, one of which appears to be undescribed.*

TREMATODA.

Fam. Tristomatidæ.

Genus *Cal~~l~~icotyle*, Diesing (1850).

d

alicotyle

Character.—Body thin, tolerably expanded; posterior sucker discoidal, nearly sessile, and provided with seven rays and two spines; the mouth without suckers.

Callicotyle affinis, new species. Pl. VII., fig. 1.

The Trematode recorded here has a close resemblance to *Callicotyle kröyeri*, Diesing, found on various kinds of skates (*Raia clavata*, *radiata*, and *batis*), but one or two obvious differences prevent its inclusion in the same species, and as I do not know of any other to which it can be ascribed, the name *Callicotyle affinis* may be given to it.

It differs from *Callicotyle kröyeri* in size, being nearly one and a half times longer; in shape it is broadly ovate, and the greatest width, which is near the middle, is equal to rather less than half the length; the width of the posterior half does not vary much, but the anterior half becomes gradually narrower towards the bluntly rounded apex.

The posterior sucker is transversely broadly ovate, the width exceeding the length by about one-fifth; the anterior margin is broadly and evenly rounded, but the margin opposite is flattened and somewhat sinuate. Interiorly this sucker has, like that of *Callicotyle kröyeri*, seven submarginal compartments and a central one; the lowermost of the seven compartments is in the middle line, and has on each side a slightly curved tooth; the centre compartment is not round as it is in *Callicotyle kröyeri*, but transversely narrow. There are apparently no suckers at the anterior end, and in this respect it also agrees with *Callicotyle kröyeri*.

The length of the specimen represented by the drawing (fig. 1) is 9 mm.

Habitat.—Parasitic on the gills of *Chimera monstrosa*, Linné, captured in the North Sea, January 1910. Apparently rare.

Fam. Polystomatidæ.

Posterior suckers more or less numerous.

Genus *Octobothrium*, Leuckart (1828).

Trematodes provided with eight posterior suckers and usually with a small one on each side of the mouth at the anterior end.

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* I am indebted to my colleague, Dr. Williamson, for the privilege of examining the fishes on which the organisms recorded here were obtained, and to my son, Andrew Scott, A.L.S., for the drawings and photographs.

Octobothrium leptogaster, Leuckart. Pl. VII., figs. 2–5.

1842. *Octobothrium leptogaster*, Leuckart, Zool. Bruchst., vol. iii. p. 25, Pl. I., fig. 5; Pl. II., fig. 2.

In this species the posterior end is considerably expanded, and the eight suckers, which are moderately large, are situated at the ends of short finger-like processes which are spread out in the form of a fan. The body is extremely slender, especially the posterior portion extending from the fan-like expansion with its eight suckers, forward to the anterior thickened genital portion. This slender portion, which seems to have suggested the specific name, is much longer and more flexible than the anterior thickened part; along both sides of the thickened portion extends the vitelline gland in the form of two dusky longitudinal bands; the mouth, in the form of a narrow oval slit, is situated on the ventral surface near the anterior extremity. The pair of anterior suckers—one on each side of the mouth—observed in some species of *Octobothrium*, were apparently absent in *Octobothrium leptogaster*.

The posterior suckers (or *bothria*) are transversely and broadly ovate, the width being nearly equal to one and a half times the length; they are each furnished with about five spines: one springs from the anterior margin and, extending across the middle, divides the sucker into two nearly equal parts; the others are lateral and occur in pairs—two on each side; the smaller spine is nearly straight, but the larger is incurved and hook-like.

The eggs are of an oval shape, widest in the middle; width equal to about half the length, horn-coloured, and semi-transparent; length about 0·2 mm.; one end is produced into a short beak from which springs an exceedingly long and extremely slender colourless filament; the other end is without an appendage of any kind.

The entire length of the specimen represented by the drawing is 39 mm. The neck and body are marked by numerous faint transverse lines.

Habitat.—Parasitic on the gills of *Chimera monstrosa* captured in the North Sea in January, 1910; apparently not very rare.

Genus *Axine*, Abildgaard, 1795(4).

In this genus the posterior suckers are small and numerous.

Axine bellones, Abildgaard. Pl. VII., figs. 6–7.

1794. *Axine bellones*, Abild., Skift. af Naturhist. Selskab., t. iii., p. 59, tab. vi., figs. 3a, b.

1836. *Heteracanthus pedatus* et *sagittatus*, Diesing, Nov. Act. Nat. Cur., vol. xviii., i., p. 310, tab. xvii.

1850. *Axine bellones*, Diesing, Syst. Helminth, vol. i., p. 425.

1858. *Axine bellones*, P.-J. van Ben., Bull. de l'Acad. Roy. de Belg., vol. xxiii.

1858. *Axine bellones*, P.-J. van Ben., Acad. des Sci., Suppl. aux Comptes rendus, t. ii., p. 53.

1863. *Axine orphii*, P.-J. van Ben. and Hesse, Rech. sur la Bdellodes ou Herudinées et les Trématodes, p. 116, Pl. xii., figs. 19–27.

Body flat, thin, elongated; anterior extremity very attenuated, but becoming gradually wider towards the posterior end; posterior extremity expanded so as to assume the form of a hatchet ("hache"). The anterior end has the apex pointed, but it may also by contraction become emarginate (fig. 7). The mouth opening is denticulated and provided with two lateral, oval, and denticulated suckers. The genital aperture is of medium size and furnished with fasicles of minute teeth or hooks arranged partly vertical and lateral. The posterior suckers, which are small and of an oval form, are each armed with four hooks, and each sucker appears to be divided into two nearly equal parts. The suckers seem to be supported on minute prominences and crowded together along the edge of the expanded membranous border which terminates the posterior end of the body. The number of suckers on the specimen represented by the drawing (fig. 6) is fifty-two. According to van Beneden, the suckers are mobile and can turn towards or away from each other, and that also by contraction to appear sometimes to be fewer in number and sometimes more numerous. Along the middle of the body and at the posterior extremity the colour is yellowish-white, while along each side is a dusky-coloured border.

The length of the specimen figured is about 10 mm., but others reach only to 8 or 9 mm., or are even smaller.

Habitat.—Parasitic on the gills of the sea pike or Gar-fish, *Ramphistoma belones*, Linn. (*Belones vulgaris*, Cuv.); captured in the North Sea about the end of April and beginning of May, 1910; apparently not very rare.

Genus *Amphiptyches*, Grube and Wagener (1852).

Amphiptyches urna, Grube and Wagener. Pl. VIII.

1852. *Amphiptyches urna*, G. and W., Müller's Archiv (1852). Pl. xiv.

Several examples, which include some apparently adult as well as others scarcely mature, were obtained in the intestine of specimens of *Chimera monstrosa* sent to the Laboratory at the Bay of Nigg from the Aberdeen Fish Market in January, 1910. The fish, it is understood, were captured in the North Sea.

Amphiptyches differs remarkably in its general appearance from the Entozoa usually met with in the intestines of marine fishes, while on the other hand it has a strong superficial resemblance to certain species of the Nudibranch mollusca. There also appears to have been at first some doubt as to the relationship between these parasites and the fish in which they were observed.

The parasite was described by Grube and Wagener in 1852 in Müller's Archiv, under the name of *Amphipticches urna*. The specimens, along with the shells of *Mactra*—a Lamellibranch shellfish—were found in the intestine of *Chimera monstrosa* captured in the Mediterranean.

Diesing, in his Revision der Helminthen, 1858, ascribes this organism to his genus *Gyrocotyle*, and records it under the name of *Gyrocotyle amphiptyches*, Gr. and W.

In 1859 Dr. Paul Gervais and P.-J. van Beneden, in their work "Zoologie médicale," vol. ii., p. 193, after referring, under the sub-order Polycotylares Blainv., to various genera of the Tristomidae, proceed to remark that the *g. Amphiptyches* found by Grube and Wagener in the intestinal canal of *Chimera* appeared to be a parasite of that mollusc, and that its position in the fish was that of an erratic—a parasite that had lost its way by being accidentally swallowed by the *Chimera.**

In a further note, however, on these parasites published in his work on "Les Poissons des Cotes de Belgique" in 1870, Professor P.-J. van Beneden remarks that, having studied this singular worm only from specimens preserved in liquer obligingly communicated to him by G. Wagener, he had some doubt about them being internal parasites of fishes, and adds that, having since procured an adult *Chimera* captured on the coast of Norway,

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* Le G. *Amphiptyches*, trouvé par Grube et G. Wagener dans le canal intestinal de al Chimère avec des coquilles de Mactre, pourrait bien être un parasite de ce dernier Mollusque, se trouvant à l'état erratique dans le poisson qui l'a fourni. Il n'y a en effet aucun autre ver polycotylaire vivant dans le tube digestif.

"we had the good fortune to find two *Amphiptyches urna* in its intestine, and we now conclude that it is an Nostosite,"* that is, a parasite that has now reached its ultimate destination, and therefore a true parasite of the *Chimera*.

In 1890, in Hist. Nat. des Annelés (coll. des Suites a Buffon), Vol. III., 2nd Part, the author, M. l'Professeur Léon Vaillant, mentions in a footnote to *Gyrocotyle*, Diesing (p. 539), that this "must not be confounded with the *Amphiptyches*, Gr. and W., the unique species of which *A. urna* has been wrongly described under the name of *Gyrocotyle amphiptyches*, W., this last belonging to a group of Trematodes." But though *A. urna* is referred to in the statement just quoted as unique, there appears to be at least another species, *A. rugosa*, parasitic in a fish found in the South Seas. In the Memoir on Flatworms and Mesozoa by F. W. Gamble, in Vol. II. of the "Cambridge Natural History" (1896), the author not only refers to *Amphiptyches urna* and *A. rugosa*, but appears to regard them, not as Trematodes, but as Monozootic Cestodes belonging to a special family, the Cestodaria or Monozoa. The following are that author's remarks on this interesting point (p. 77):—

"Just as some Coelenterata (*Lucernaria*) may be regarded as not having advanced much beyond a scyphistoma stage, so there are unsegmental Cestodes (*e.g.*, *Archigetes*) which have remained as a slightly altered but sexual scolex, directly comparable with a Trematode, and, as all authors are agreed, representing one generation only. Such monozootic forms are now classed as a special family, the Cestodaria or Monozoa of which *Caryophylleus mutabilis* from the intestine of various Cyprinoid fish is the most abundant representative, while *Amphiptyches* (*Gyrocotyle*) *urna* from *Chimera monstrosa* of the Northern hemisphere is paralleled by *A. rugosa* found in *Callorhynchus antarcticus* from the Southern seas."

The specimens of *Amphiptyches* recorded by Grube and Wagener were found associated with the shells of *Mactra*; the specimens of *Chimera* from the Fish Market in which the parasites dealt with here were obtained had only a moderate quantity of food in their stomachs, which consisted of various organisms, chiefly small Crustacea, Echinoderms and Annelids, along with a few small Molluscan shells such as *Anomia*, *Pecten*, *Cardium*, *Buccinum*, *Fusus*, *Scalaria*, all of them small or immature. The parasites varied greatly in size—in length as well as in width. The longer specimens were narrow in proportion and the wider ones shorter. The longer specimens, such as that represented by fig. 1, measured fully 30 mm. by 10 mm. in width, while that represented by fig. 3 measured 24 mm. by 15 mm. The specimen represented by fig. 4 appears to be a young form. The specimens have the appearance of being incomplete, or as if they were segments of a larger form. They all occurred, however, as separate organisms; there was no sign of any being joined to one another, though considerable care was taken to ascertain if in any case that were so.

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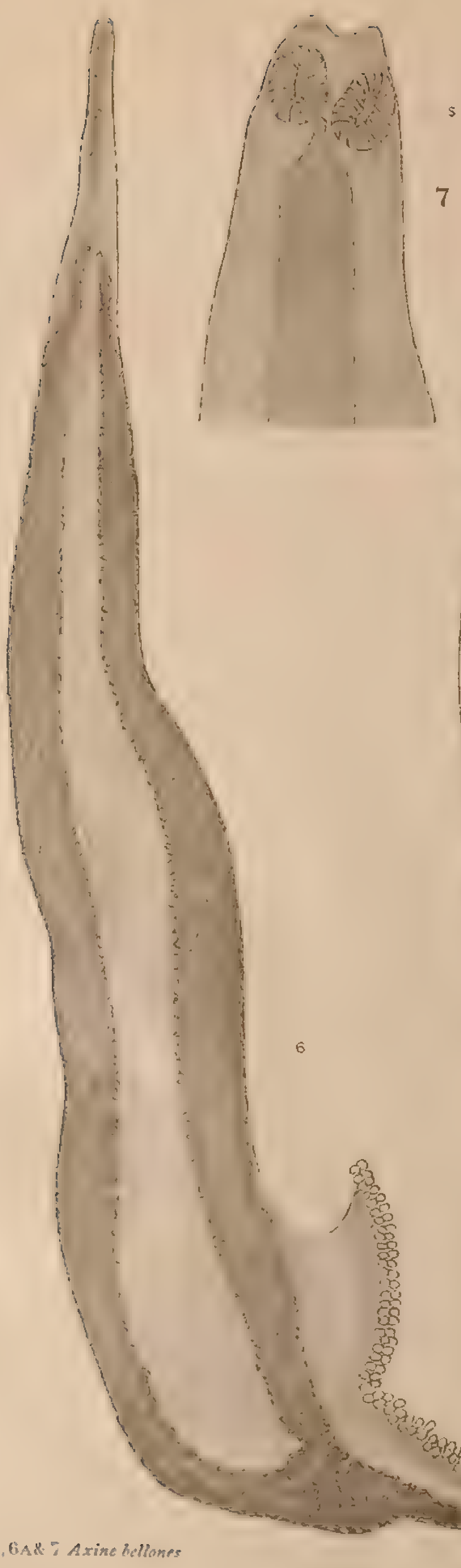
* Ce singulier ver a été trouvé d'abord par G. Wagener dans l'intestine de la Chimère de la Méditerranée ; nous n'avons pu l'étudier que sur des individus conservés dans la liqueur, que G. Wagener nous a obligeamment communiqués ; sont-ils de vrais parasites internes de ces poissons ? Nous en avons douté, et nous pensions que ces magnifiques Trématodes étaient des parasites de quelque mollusque bivalve que le poisson avait avalés, c'est-a-dire, un parasite erratique , nous nous étions trompé. Ayant per nous procurer depuis une Chimère adult dans la liqueur, provenant de la côte de Norwége, nous avons eu la bonne chance de trouver deux *Amphiptyches urna*, adultes, dans l'intestin. Nous pouvons en conclure que c'est un Nostosite. *Cf. op. cit.*, p. 21.

PLATE VII.



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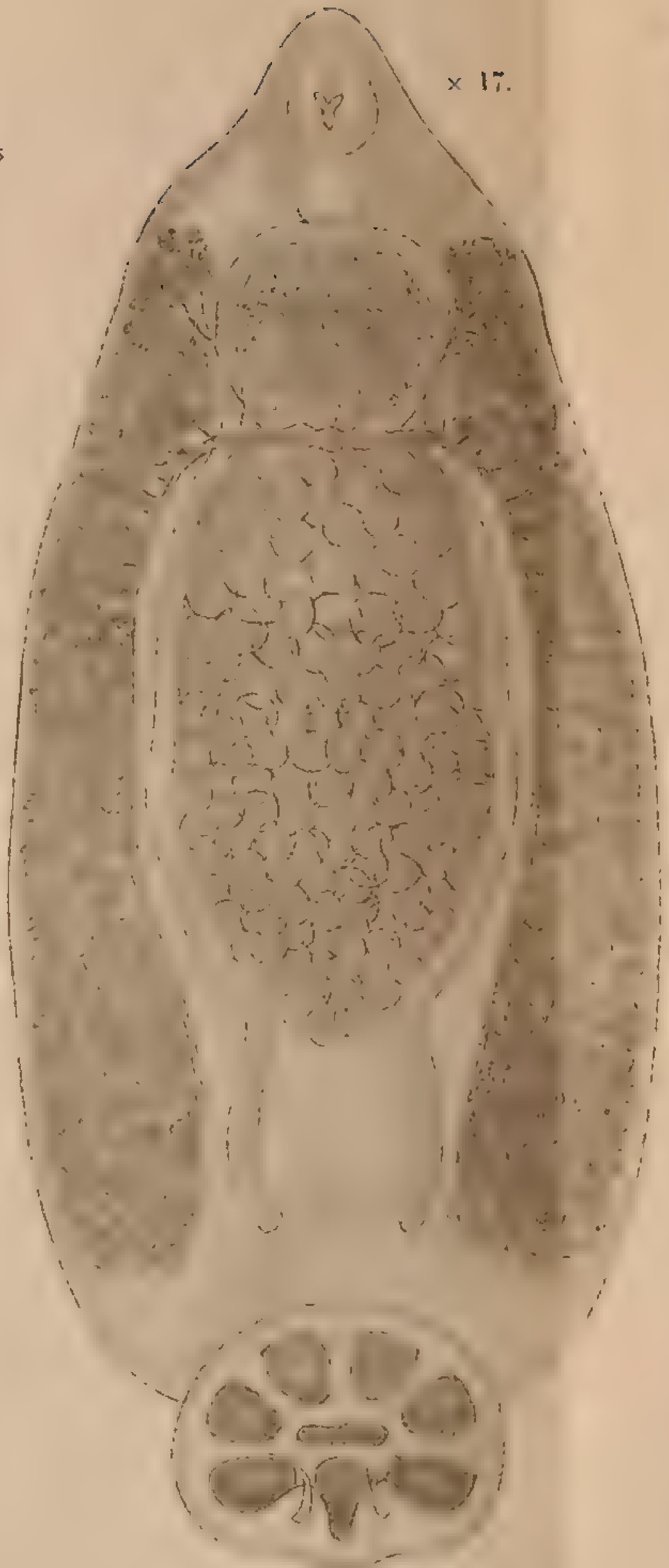
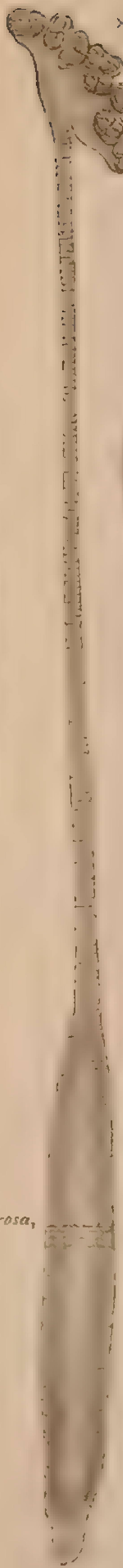
6

6a

6, 6a & 7 *Axine bellones*



1. *Callicotyle affinis*, from *Chimera monstrosa*, captured in North Sea, January 1910.



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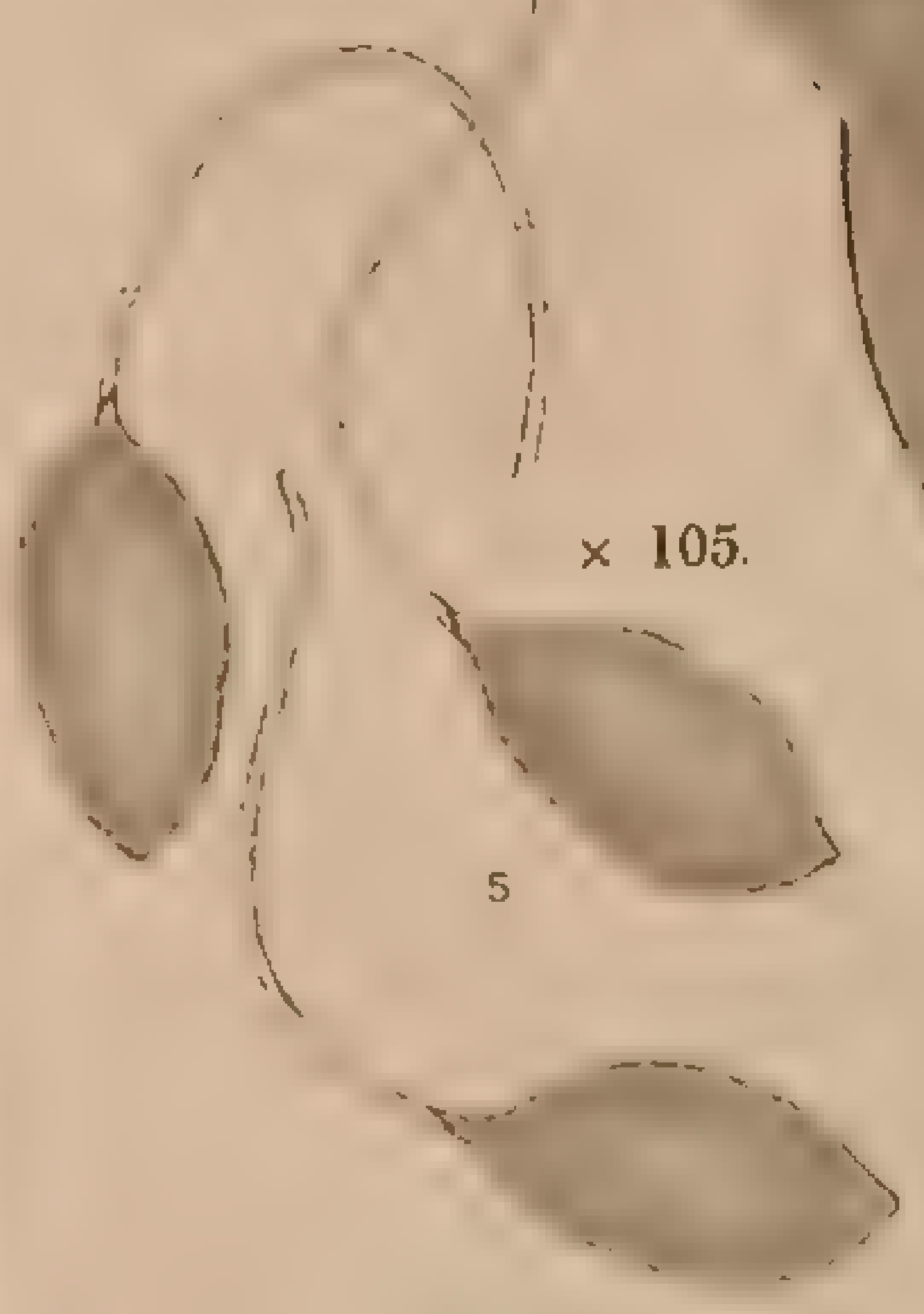

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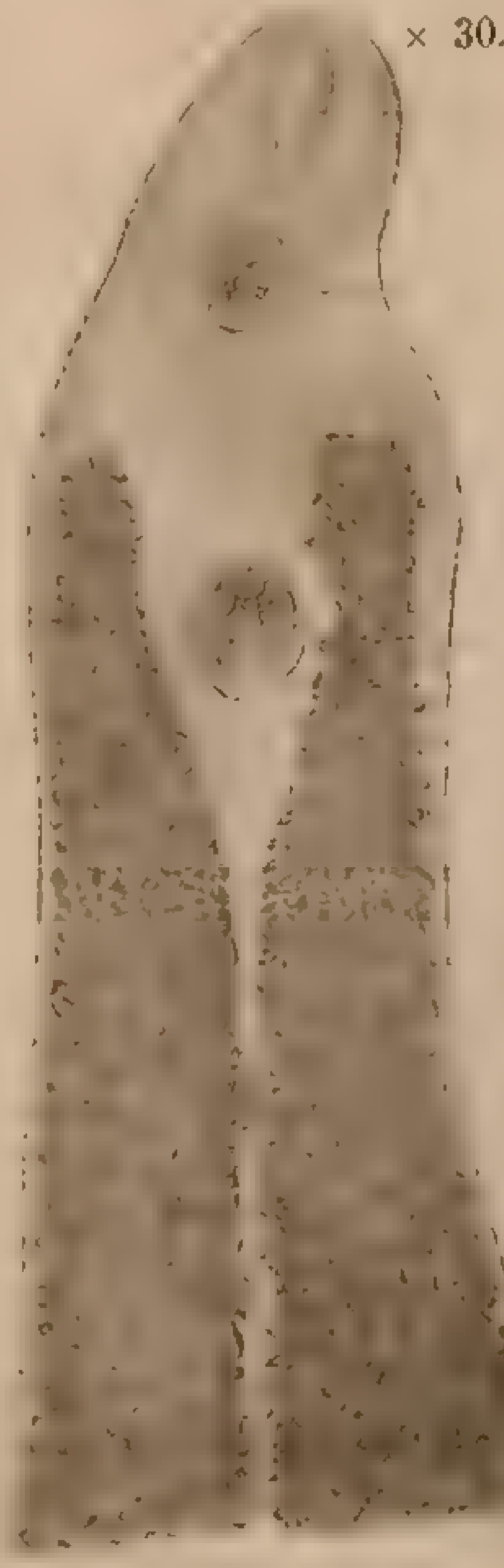
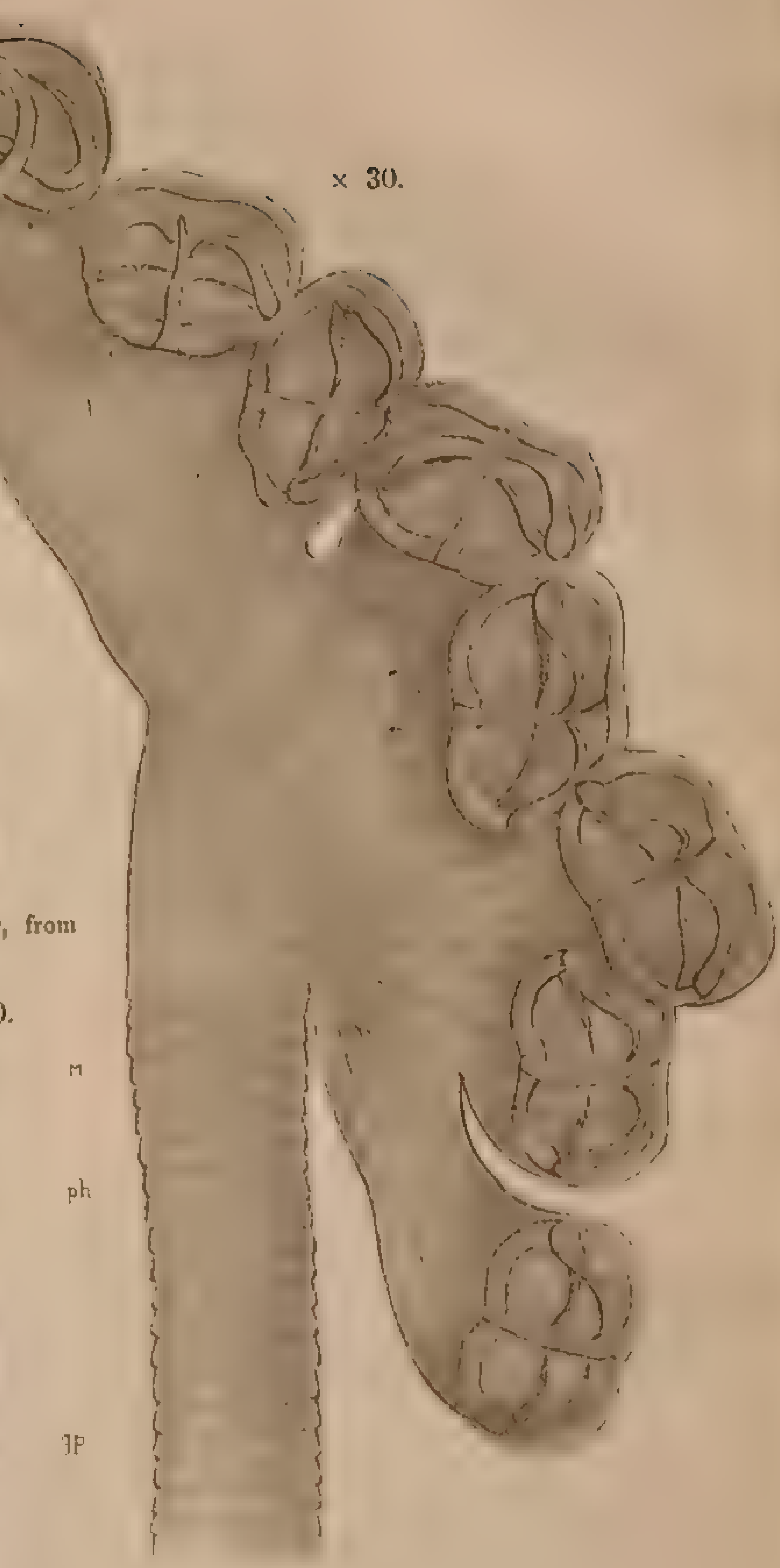
5. Eggs of *Octobothrium leptogaster*, from gills of *Chimera*.

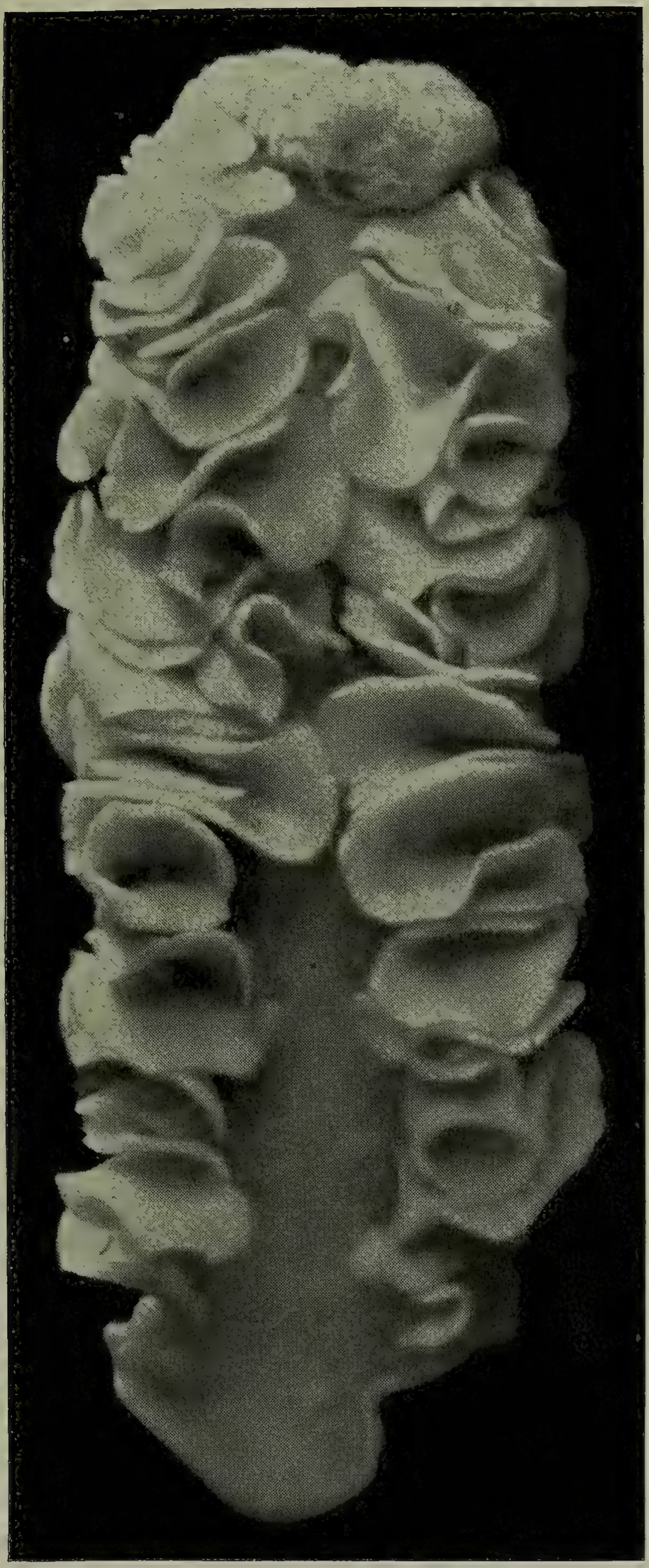


3. *Octobothrium leptogaster* (head): *M*, mouth: *ph*, pharynx: *gp*, genital aperture: *vg*, vitelline gland.



4. *Octobothrium leptogaster*, Leuck. from gills of *Chimera monstrosa*, captured in North Sea, January 1910.

A. Scott, *del.*



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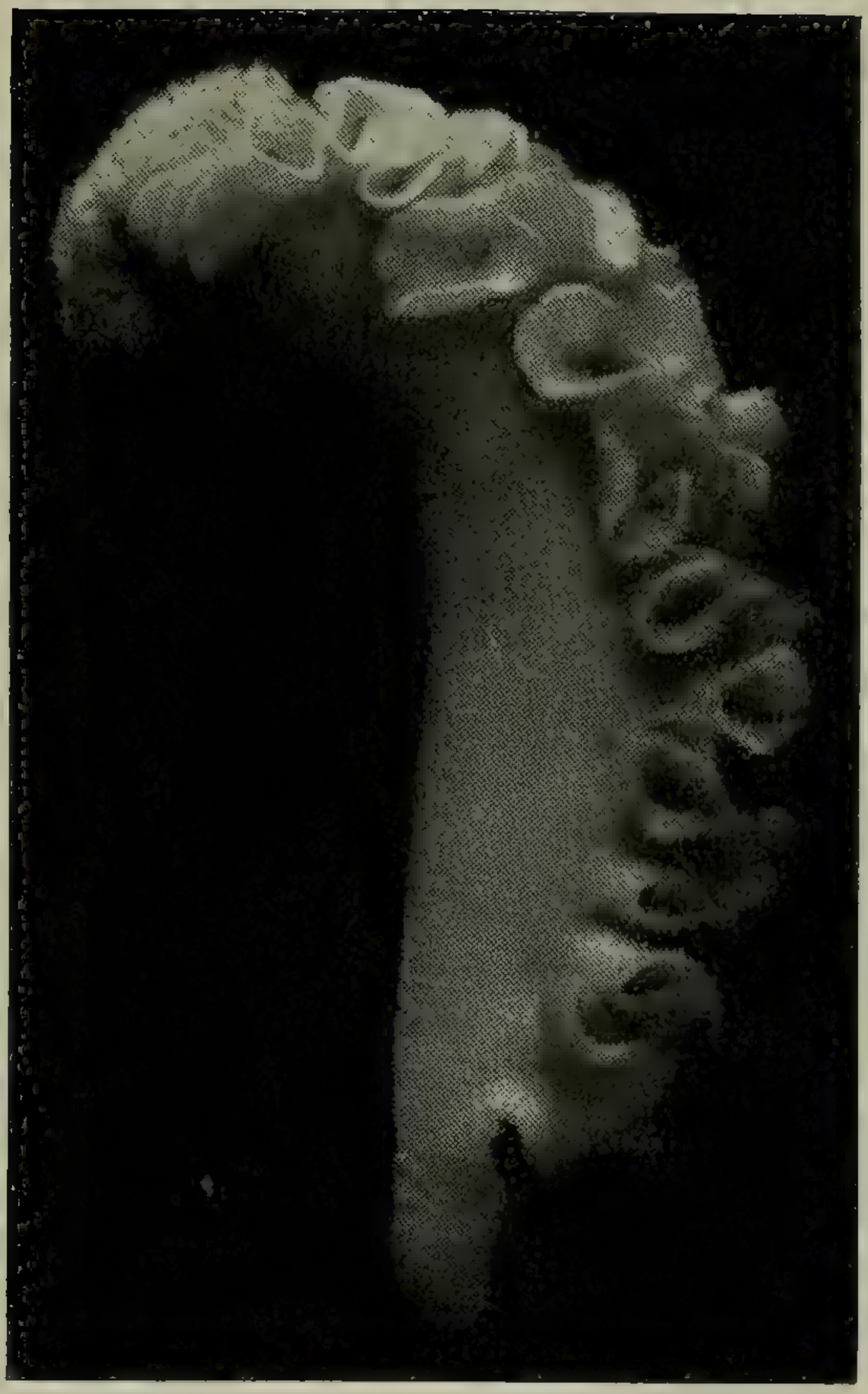

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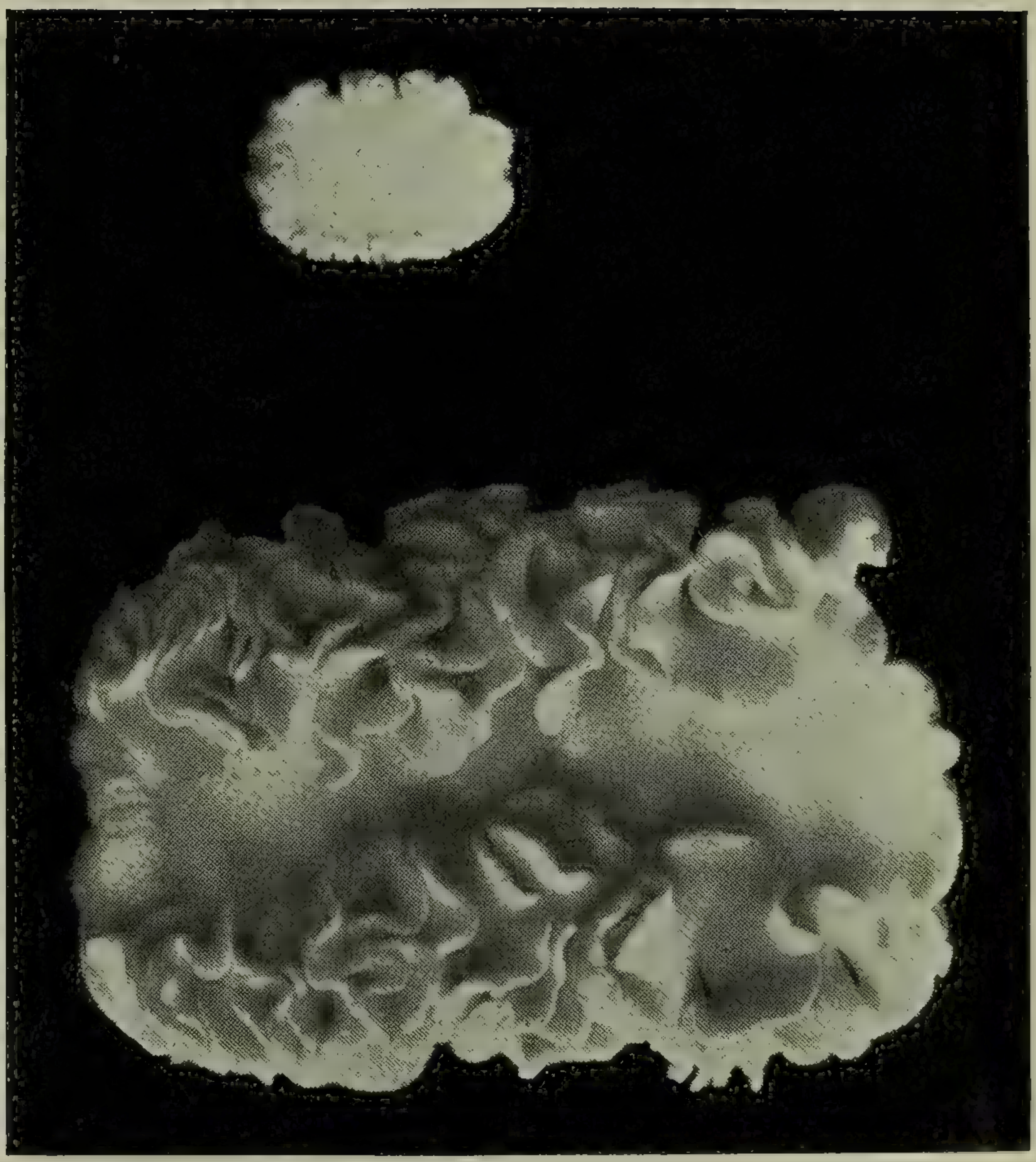

4.

3.

A. Scott, Photo.

EXPLANATION OF THE PLATES.

PLATE VII.

Callicotyle affinis, T. Scott.

Fig.	1.	Underside of specimen to show posterior sucker,	× 17

Octobothrium leptogaster, Leuckart.

Fig.	2.	Adult specimen,	× 5
Fig.	3.	Anterior end, ventral aspect, (*en.*, mouth: *ph.*, pharynx; *gp.*, genital aperture; *vg.*, vitelline gland.)	× 20
Fig.	4.	Posterior end, ventral aspect,	× 30
Fig.	5.	Three of the eggs removed,	× 105

Axine bellones, Abildgaard.

Fig.	6.	Adult specimen, ventral aspect,	× 20
Fig.	6*a*.	One of the posterior suckers,	× 140
Fig.	7.	Anterior end, ventral aspect (*s.*, anterior suckers),	× 140

PLATE VIII.

Amphiptyches urna, Gr. and W.

Fig.	1.	Specimen seen from above,	× 4·5
Fig.	2.	Specimen seen from the side,	× 2·3
Fig.	3.	Another specimen, seen from above,	× 2·3
Fig.	4.	A small (young?) specimen,	× 2·3

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